Analysis

Are weakly profitable firms suppressing economic growth?

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Unprofitable 'zombie' firms have been on the rise in Finland, both proportionately and in absolute terms, since the beginning of the 2000s. At most, they have accounted for approximately 10% of all labour and capital allocated within the corporate sector. Zombie firms can survive for years, but in the long term they must either revitalise and become profitable or exit the market. Keeping unprofitable firms on life support for extended periods of time can distort the efficiency of markets and is associated with a variety of risks. For one, the share of capital and labour allotted to zombie firms prevents these resources from being allocated more efficiently elsewhere, weakening operating conditions for profitable companies. This opportunity cost lowers productivity and weakens growth opportunities for the entire economy. Furthermore, zombie firms are generally highly leveraged and raise the risk of credit defaults and financial market disruptions. Identifying zombie firms is not entirely straightforward, however, as the classification is in itself heterogeneous and includes growing companies with weak current profitability who may, in the long term, eventually contribute to economic growth.

The growth literature has largely focused on successful, rapidly-growing 'gazelle' or 'superstar' companies, and efforts have been made to understand how these firms contribute to the aggregate growth and productivity of an economy. In recent years, interest has also turned towards the weakly performing but resilient firms who may in fact be a drag on the economy.[1] Here, there has been interest in assessing whether the economic policies practised after the financial crisis have helped sustain, or indeed expand, the share of these 'zombie firms'.

The proportion of insolvent or unprofitable zombie firms has increased in Finland since the turn of the millennium, in a trend widely seen in other OECD countries. In several studies, a zombie firm is defined as a business whose earnings before interest and taxes (EBIT) do not cover its interest payments nor other financing costs over three consecutive years. These companies serve as a drag on economic growth, as their productivity is generally lower than that of other firms and the resources allocated to them could be used more efficiently elsewhere. Studies also indicate that when weakly performing firms compete for the same pool of capital and labour resources as more successful businesses, profitable companies see their growth conditions diminished.[2] As a result, even a relatively low share of zombie firms can have negative repercussions for economic growth and productivity.

In this article, we analyse the relative growth of weakly performing firms and their share of

resource utilisation since the turn of the millennium. We evaluate the idiosyncrasies of zombie firms in light of firm-level data and assess their impact on their respective sectors. In addition, we offer reflections on why weakly performing firms are able to demonstrate such surprising longevity.

Zombie firms devour economic resources

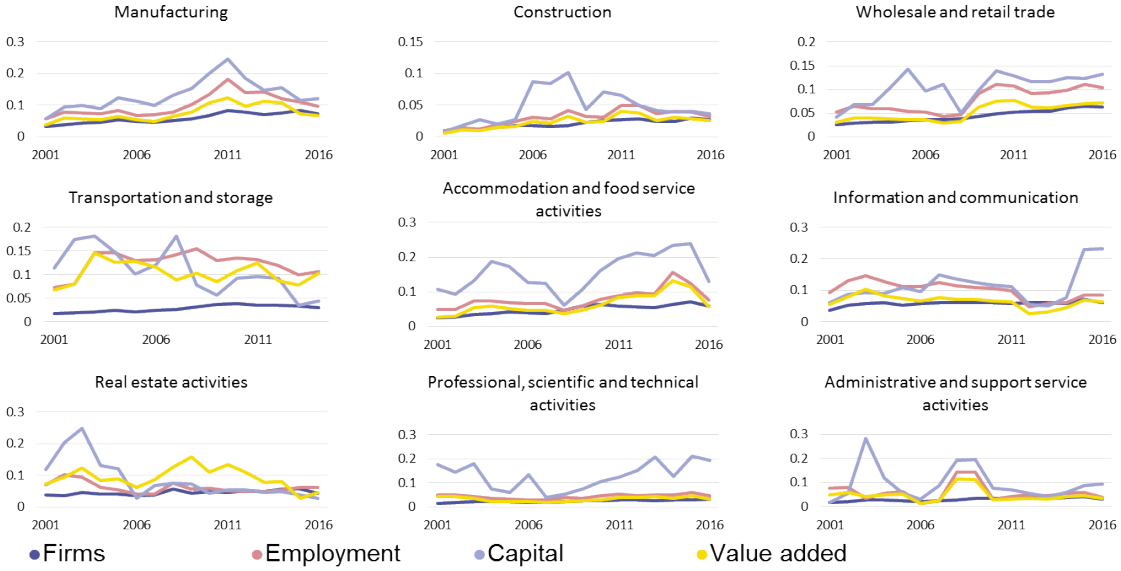
Productivity is determined by how efficiently firms are able to utilise an economy's resources; hence, productivity can grow when labour and capital are increasingly allocated towards companies who are in and of themselves productive. Well-functioning markets are characterised by a process of creative destruction where efficient and productive firms grow, while weaker and less productive companies shrink and eventually exit the market.

In the literature, various alternative definitions of 'zombie firms' exist, but they are generally all based on a measure of a firm's profitability. In this article, we share the OECD's favoured definition and identify zombies as firms whose interest coverage ratio (the ratio of operating income to interest expenses) is less than one (EBIT/interest < 1) over three consecutive years.[3] In practice, this means that a company must take on additional debt to cover its interest payments.

In Finland, the proportion of zombie firms has increased over the years 2000–2015 as part of a wider trend observable within the OECD, although Finland's relative share of zombies still remains smaller than that of many other European countries. In Finland, zombies have at most constituted less than 5% of all companies, while in Belgium and Spain, for example, the corresponding figures are near 10%.[4] Even so, focusing too heavily on the proportion of zombies belies their economic impact, as their ubiquity is far outweighed by the amount of resources (i.e. capital and labour) sunk into them. Furthermore, zombies are notably overrepresented in their combined share of value added and indebtness, which suggests that zombies include a considerable number of large firms (Chart 1).

Chart 1.

Sectoral decomposition of zombie firm % as well as zombie % weighted by employment, capital and value added, 2000–2016



Sources: Statistics Finland and Bank of Finland.
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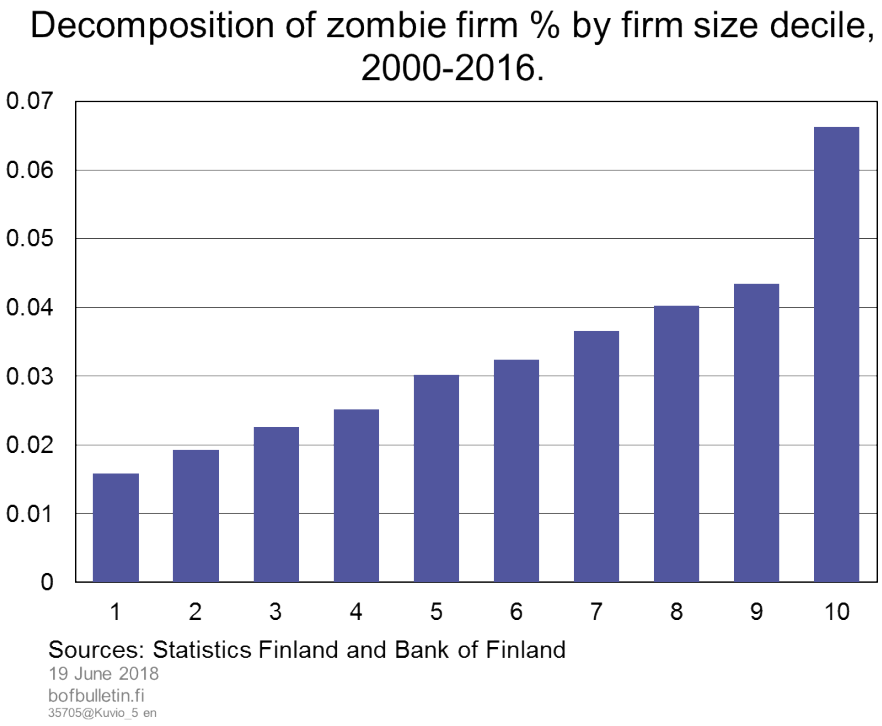
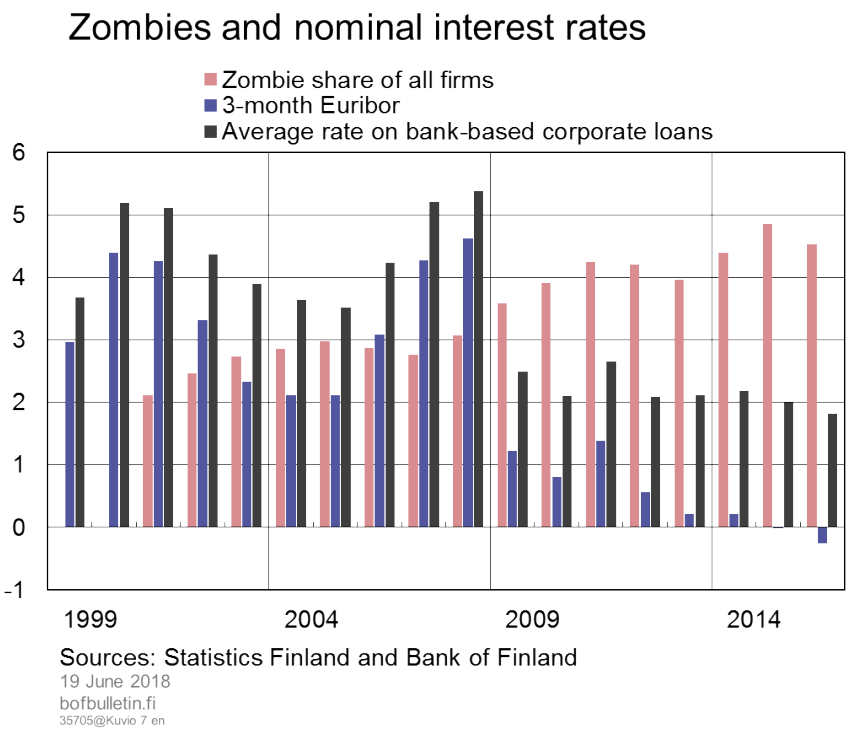
While the proportion of zombies has increased across all sectors, there are different patterns in the amount of resources that are sunk into zombies in each sector (Chart 2). Broadly speaking, the secular rise of unprofitable firms remained relatively slow in the years preceding the financial crisis. During the crisis this accelerated somewhat, seemingly driven by cyclical conditions. The crisis was followed by a slight recovery, but the share of unprofitable companies has once again increased in most sectors since 2011–2012, although cyclical growth slightly mitigated this trend in 2016.

Chart 2.



Zombies generally suffer from less-than-average productivity compared with most other firms (Chart 3). This effectively restricts economic growth, as the capital and labour resources sunk into zombies could, in principle, be allocated towards more efficient production.

Chart 3.



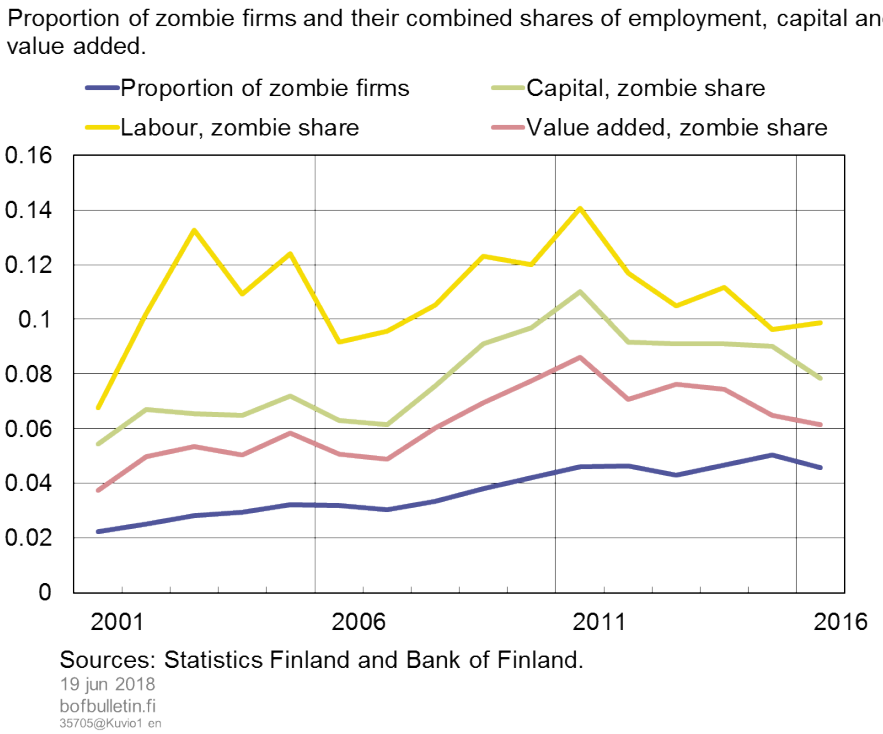
‘Too big to fail’

It is standard practice to identify zombies on the basis of a single weak performance metric, but this easily includes firms who are growing and whose weak profitability is often temporary. For example, investment involves a necessary trade-off between short-term costs and future productivity and profitability growth, which may cause performance metrics to ostensibly decline before revenue catches up. Start-up companies are particularly vulnerable to this.

The above notwithstanding, Finland's zombie firms can be characterised neither as small nor young (Charts 4–5). In fact, the share of zombie firms appears to rise in proportion with age and size, which is to say that, relatively speaking, the largest demographic of zombies can be found within the ranks of large and well-established firms. In the literature, this observation has been attributed to the ‘too big to fail’ theory: large firms, who may be seen as indispensable regional employers, are not allowed to collapse due to the threat of higher unemployment.

Chart 4.

Chart 5.

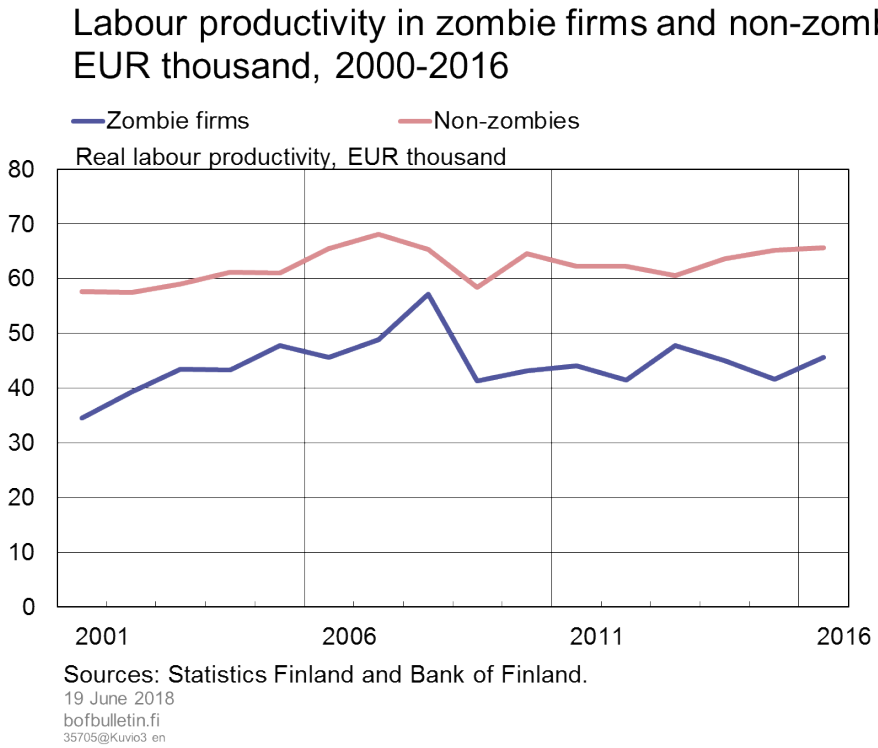


Growing firms also dubbed ‘zombies’

A closer inspection of firm-level data reveals that many of the firms identified as zombies are companies who are seeing growth. Weak profitability may only be a temporary issue for a significant number of these firms, and many of them might even contribute to economic growth in the long term. Of all zombie firms, approximately one third are seeing growth (over +1% annualised), and this share is even larger among companies with at least 20 employees (see Chart 6).[5]

Some recent studies (e.g. Adalet McGowan et al., 2017) have implemented an age restriction to separate real zombies from start-up companies who may still have comparatively high operating costs and low revenue. This adjustment, however, does not fully resolve the issue, as up to one-third of comparatively geriatric zombies see growth but otherwise satisfy the OECD's definition of a zombie firm.

Chart 6.



Weakly profitable firms inhibit productivity and employment growth

In the literature (e.g. Caballero et al 2008; Adalet McGowan et al. 2017), it has been observed that

the survival of zombie firms may distort competition and weaken market efficiency. Healthy markets are characterised by a process of creative destruction, where insolvent or unprofitable companies reduce their share of labour and successful companies invest and create new jobs. When zombies participate in the market, they raise demand for labour and intensify competition for market share. This has the consequence of lowering product prices and increasing wages, effectively congesting growth conditions for more promising firms.

By evaluating not only firm-specific data but also estimates of the sectoral decomposition of zombie shares, we can attempt to quantify the impact that zombies have on production and employment growth. The use of sectoral estimates is based on the notion that if a large share of any given sector's labour, capital, output or sales is held by zombie firms, this will negatively impact the performance of the entire sector and especially weaken growth conditions for more robust companies. To verify this phenomenon, we use the panel data to model corporate growth in the 2000s. Growth in employment or output is determined by whether a firm is a zombie or non-zombie and how large the zombie share is of the sector's capital or labour (multiplied by the non-zombie dummy variable). In other words, our specification takes the form:

$$\Delta \log(L_{it}) = \alpha_{i0} + \alpha_1 Zombie_{it} + \alpha_2 cross_z_{it} + controls + \mu_{it}$$

Table 1.

How does the volume of zombies firms affect growth?

Specification	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
zombie	−0.113	−0.105	−0.102	−0.082	−0.118	−0.105	−0.093	−0.023
	(79.82)	(73.57)	(62.92)	(191.20)	(44.43)	(39.37)	(32.01)	(45.32)
cross_z	−0.021	−0.005	−0.009	0.048	−0.024	0.003	−0.004	−0.021
	(6.40)	(1.27)	(2.23)	(10.49)	(3.97)	(0.60)	(0.60)	(13.42)
controls	none	years	years	years	none	years	years	years
		sectors	sectors	sectors		sectors	sectors	sectors
R^2	0.0044	0.0094	0.0028	0.000	0.0015	0.0054	0.004	0.0004
dependent variable	ΔL	ΔL	ΔL	ΔL	Δy	Δy	Δy	Δy

model	RE	RE	FE	FE, W	RE	RE	FE	FE, W

Specification	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
zombie	−0.121	−0.104	−0.100	−0.077	−0.135	−0.093	−0.094	−0.020
	(84.62)	(70.45)	(59.42)	(172.82)	(48.87)	(38.46)	(30.77)	(38.052)
cross_z	−0.162	−0.002	0.014	0.048	−0.240	−0.012	0.001	0.011
	(25.56)	(0.25)	(1.68)	(22.28)	(20.90)	(0.91)	(0.08)	(4.48)
controls	none	years	years	years	none	years	years	years
		sectors	sectors	sectors		sectors	sectors	sectors
R^2	0.0045	0.0094	0.0028	0.000	0.0015	0.0054	0.023	0.0004
dependent variable	ΔL	ΔL	ΔL	ΔL	Δy	Δy	Δy	Δy
model	RE	RE	FE	FE, W	RE	RE	FE	FE, W

In the table, the dependent variables are either the growth rate of employment ΔL or output (real value added) Δy. The cross_z term denotes the capital (equations 1–8) or labour (equations 9–16) share of zombie firms multiplied by the non-zombie dummy variable. Controls are dummy variables for different years (15) and sectors (55). The panel data comprise 1,484,457 observations. RE and FE stand for random and fixed effects, respectively. W means that the observations for each firm have been weighted by its number of employees.

The results are relatively easy to interpret: As expected, weakly profitable firms see much slower growth on average than profitable firms. There is also evidence which suggests that a large share of zombies will hinder employment growth in the entire sector; however, this observation is slightly sensitive to the control variables and weighting. This would seem to indicate that overall competitiveness and market conditions influence the degree to which zombies might impact the performance of any given sector.[6]

Do business subsidies sustain zombies?

The surprising longevity of many zombie firms might be explained by factors found within the

firms themselves or other factors determined by their operating environment. According to the literature, the latter may include government business subsidies (e.g. Jiang 2017), subsidised lending to insolvent firms, and large holdings of non-performing corporate loans on banks' balance sheets, such as in Japan in the 1990s (see e.g. Hoshi 2000, Caballero et al. 2008). More recent studies have also examined how unusually low interest rates might affect the survival of zombie firms (e.g. Adalet McGowan et al. 2017, Acharya et al. 2016, Borio 2018).

Thus far, relatively little is known on how business subsidies might impact the survival rate of zombies. Corporate subsidies come in many forms and may be expected to have different effects on zombies, at least quantitatively speaking. This plurality is also reflected in our research data.

It is feasible, however, that one reason why zombies are able to endure for year after year might be that they receive an inordinate share of subsidies (e.g. employment and start-up grants). We tested this hypothesis against our panel data by evaluating the correlation between business subsidies and weak profitability using a simple regression model:

$$Zombie_{it} = \alpha_{i0} + \beta_1 Zombie_{it-1} + \beta_2 share_{it} + \beta_3 d_subs_{it} + controls + \mu_{it}$$

The dependent variable in the model is an indicator variable, which determines whether a firm is a zombie or not. In other words, the variable receives the value 1 if a firm is a zombie and the value 0 when it is not. The model has two independent variables related to business subsidies: 'share' denotes the zombie share of subsidies in each industry, while d_subs is an indicator variable that shows whether the firm has received subsidies.

The model is based on the presumption that weakly performing firms receive more subsidies than average. It is also possible that such firms are more prevalent in specific sectors where weakly performing firms receive more subsidies in general.

Table 2.

How business subsidies affect the share of zombies?

Variables	**1**	**2**	**3**	**4**	**5**	**6**
$zombie_{it-1}$	0.281	0.606	1.136	3.651	2.918	0.272
	(475.53)	(1057.78)	(223.75)	(163.61)	(140.79)	(453.84)
share	0.078	0.021	0.665	0.909	1.257	0.023
	(48.78)	(32.02)	(41.87)	(20.59)	(30.54)	(12.35)

d_subs	0.049	0.014	0.335	0.155	0.665	0.041
	(51.88)	(35.21)	(39.73)	(7.36)	(36.42)	(42.12)
controls	years	years	years	years	years	years, sectors, age
R^2/sigma_u	0.1318	0.2949	1.268	0.961	1.287	0.1362
model	OLS, RE	OLS, RE	Logit	Logit	Logit	OLS
zombie	Z1	Z2	Z1	Z3D	Z3G	Z1

The independent variable is an indicator variable which denotes zombie firms; share indicates the zombie share of subsidies in each industry; d_subs is a dummy variable that denotes whether a firm has received subsidies; OLS denotes a linear probability mode; Logit denotes logit estimates; Z1 (Z3) denotes a 'one-year (three-year) zombie firm'. (Lagged) values for years, sectors and potential ages are 15, 55 and 115, respectively.

Based on this simple regression analysis, business subsidies would appear to influence the overall quantity and sectoral distribution of zombies. It is difficult to assess the degree of causality, as our variable indiscriminately includes all (paid) subsidies, but the effects of different subsidies may vary considerably based on their type and the criteria by which they are granted to firms. Nonetheless, researching the effects of business subsidies warrants much further analysis, even in light of these very preliminary results.

Low interest rates and firms' interest rate margins

What other factors might allow for weakly profitable firms to endure in markets? More recently, the literature (e.g. Adalet McGowan et al. 2017; Borio 2018) has focused on the possible impact of low interest rates. The effects of providing insolvent firms with credit subsidies in the form of lower interest rate margins has previously been studied in relation to Japan's economic downturn in the 1990s (e.g. Hoshi 2000; Caballero et al. 2008).

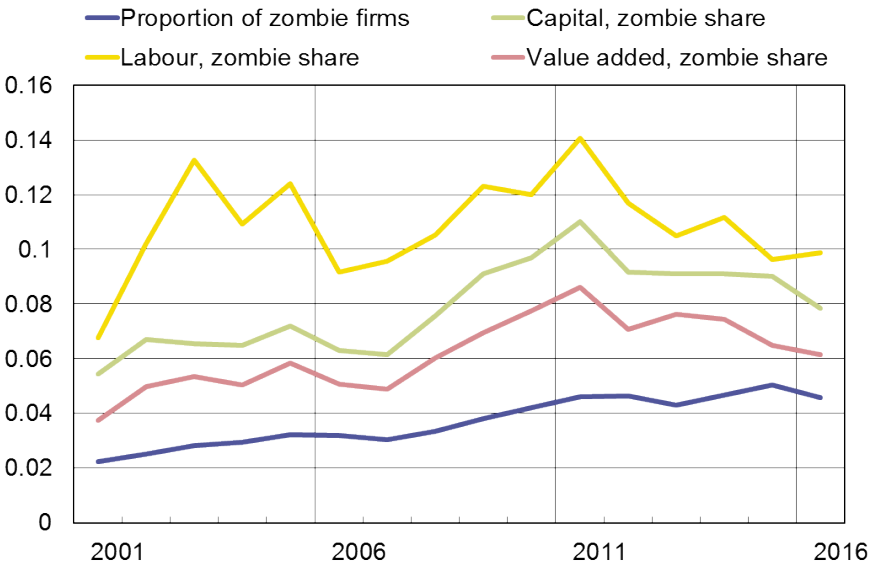
Broadly speaking, it would seem that the proportion of weakly profitable firms increases (decreases) during periods of low (high) interest rates. As is well established, nominal and real rates declined between 2001 and 2005, and again after 2008 (Chart 7). The proportion of weakly profitable firms increased during both time periods, especially after the financial crisis. However, these periods were also characterised by diminished economic growth, which weakened firms'

profitability across the board and increased the likelihood of businesses turning into zombies.

When assessing the impact of low interest rates on the proportion of zombie firms, it is important to bear in mind that interest rates respond to the performance of the economy. Low interest rates do not in and of themselves cause weak earnings growth, it is the sluggish economy that erodes the profitability of firms. Even though a low interest rate environment may prevent the weakest of firms from collapsing altogether, a decline in risk-free interest rates does not distort relative prices on financial markets.

Chart 7.

Proportion of zombie firms and their combined shares of employment, capital and value added.



Sources: Statistics Finland and Bank of Finland.
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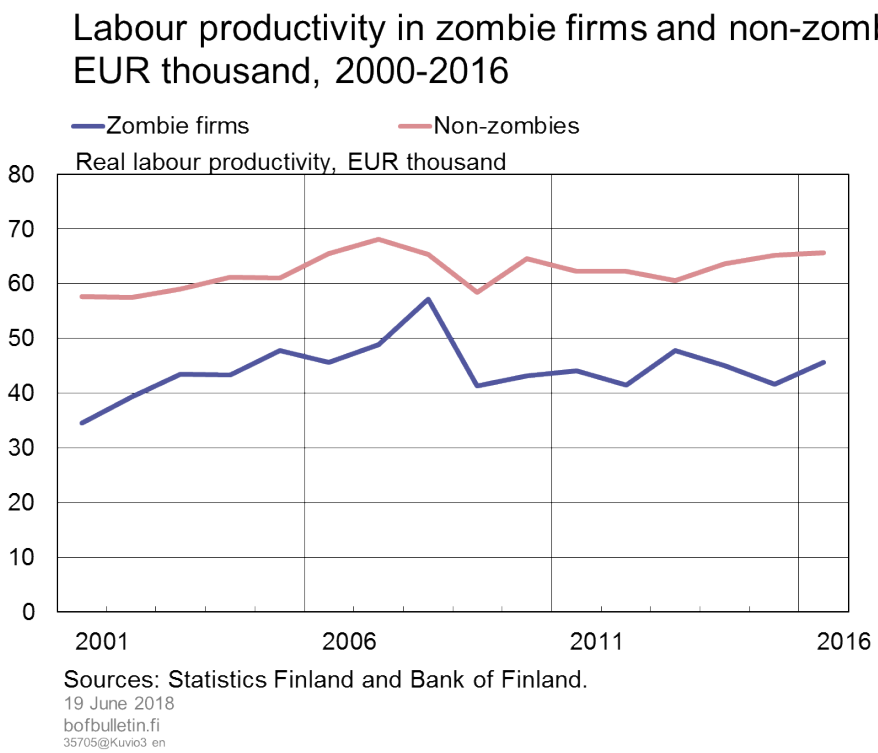
The overall interest rate path is also observable in the implicit rates paid by firms (interest expenditures relative to debt) which, at least when taken as averages, follow a logic similar to market rates, which may however soon be significantly higher[7]. The interest rate margin between zombie firms and non-zombies seems to have remained constant in recent years, at approximately 1%. This margin is also similar across sectors, indicating that Finland will be spared from a phenomenon that plagued Japan in the 1990s, where banks subsidised at least a portion of zombie firms by granting them discounted rates on loans.

Chart 8.



Weakly profitable firms who satisfy the zombie definition are heavily indebted – even up to five times more so – when measured up against other firms by inspecting value added. When adjusted against firms' balance sheets, this disparity is much smaller, at approximately 50%. In any case, the interest rate path remains of particular concern to zombie firms. Not only may sudden rate hikes prove fatal for many zombie firms, but this would leave banks holding loan losses and nonperforming receivables.[8] Another issue lies in the fact that zombies are somewhat overrepresented among large firms. In instances of 'too big to fail', a variety of non-performance related factors, such as regional politics or employment concerns, may determine the ultimate fate of zombies.

Conclusions

The outlook of the economy is evaluated all too often with crude instruments such as aggregate values and averages, while much which affects the health of the economy actually happens beneath the surface. The rise of weakly profitable firms is one such example, and might in the future lead to weaker productivity growth and various disturbances on the financial markets. Policymakers should therefore become increasingly vigilant regarding prolonged periods of weak corporate sector profitability. Our analysis raised government business subsidies as only one possible contributing factor, but others exist. These might include barriers to entry, cartels,

deficiencies in the competitive tendering of public services and so forth. Other issues might be related to corporate taxation, whose impact may have been underestimated by focusing on localised deadweight losses instead of assessing their aggregate effects on the economy.

Notes

1. See, for example: Acharya, Viral; Eisert, Tim; Eufinger, Christian and Hirsch, Christian, 2017. 'Whatever it takes: The real effects of unconventional monetary policy', SAFE Working Paper Series, No. 152; Adalet McGowan, Muge, Andrews, Dan & Millot, Valentine, 2017; 'The Walking Dead?: Zombie Firms and Productivity Performance in OECD Countries', OECD Economics Department Working Papers 1372. Of all the firms identified as zombies by these studies, approximately 85% have negative operating incomes. ↑
2. Adalet McGowan et al. (2017), Caballero, Ricardo J., Hoshi, Takeo & Kashyap, Anil K. 2008. 'Zombie Lending and Depressed Restructuring in Japan', American Economic Review, vol. 98(5), 1943–1977, December. ↑
3. It is interesting to note that the definition of zombies based on EBIT/interest < 1, adopted by the OECD as well as this research paper, is particularly robust, as it does well in classifying firms as zombies and non-zombies. Hence, if we inspect 'near-zombies', for whom 1 < EBIT/interest < 2, we see a variety of results. Alternative metrics that appear in the literature include: (i) firms with negative profits, (ii) firms whose value-added is negative or (iii) firms who are extended leveraged loans. ↑
4. See Adalet McGowan et al. (2017). ↑
5. Firms are divided into three categories based on their average annualised employment growth rate over a three-year period: 1) declining (negative growth at over -1% per annum); 2) stagnant (growth between -1% and 1% per annum); 3) growing (over 1% per annum). ↑
6. Adalet McGowan (2017) also presents a counterfactual calculation to explore how a contraction in sectoral zombie shares, back to their respective minimum levels in each country, might influence investment and employment performance. These calculations demonstrate a significant effect. ↑
7. Interest expenditures and interest rates not only include bank loans but also all other debt instruments (bonds, trade credits, derivatives). Furthermore, interest expenditures and debt may not match, as interest expenditures are calculated on an annual basis and debt at year's end. ↑
8. For risk estimates, see Storz, Manuela, Koetter, Michael, Setzer, Ralph & Westphal, Andreas (2017) 'Do we want these two to tango? On zombie firms and stressed banks in Europe', IWH Discussion Papers 13/2017. ↑

Keywords

companies/firms, productivity, profitability